CLAIMS

[0076] The embodiments of the invention in which an exclusive property or privilege is claimed include:

1. A method of characterizing an image for shape content, comprising:

producing a Fourier transform optic pattern of the image with light energy;

spatial filtering the light energy from the Fourier transform optic pattern by selecting light energy from discrete portions of the Fourier transform optic pattern at a plurality of angular orientations and separating such discrete portions from other portions of Fourier transform optic pattern to create a plurality of filtered patterns of light energy from those discrete portions;

detecting intensities of light energy as it is distributed in the filtered patterns for the respective angular orientations; and

storing the intensities of light energy detected in the filtered patterns along with the respective angular orientations.

2. The method of claim 1, including:

focusing the Fourier transform optic pattern onto an active optic area of a spatial light modulator;

selectively activating portions of the spatial light modulator at selected angular orientations to rotate plane of polarization of the discrete portions of the light energy of the Fourier transform optic pattern;

separating light with rotated plane of polarization from light without rotated plane of polarization; and

detecting the intensities of light that has rotated plane of polarization.

3. The method of claim 2, including selectively activating portions of the spatial light modulator at selected segments positioned at different radial distances from an optic axis of the Fourier transform optic pattern as well as in said angular orientations.

4. The method of claim 2, including selectively activating portions of the spatial light modulator to rotate plane of polarization of light energy in the Fourier transform optic pattern that is incident on selected sectors of the active optic area of the spatial light modulator.

5. The method of claim 4, including selectively activating portions of the spatial light modulator to rotate plane of polarization of light energy in the Fourier transform optic pattern that is incident on selected segments of the selected sectors.

6. The method of claim 1, including:

producing a plurality of ghost images around the image that is being characterized, each ghost image having shape content that is substantially the same as the image being characterized; and

producing the Fourier transform optic image from the ghost images along with the image being characterized.

7. The method of claim 6, including producing the ghost images with each ghost image having less light energy than the image being characterized.

8. The method of claim 6, including replicating original pixels that comprise the image being characterized and offsetting each such replicated pixel from its corresponding original pixel by an equal distance and angular orientation to the original pixel to create a ghost image.

9. The method of claim 8, including dispersing the plurality of ghost images in a symmetrical manner around the image being characterized.

10. The method of claim 6, including:

finding edges of the shape content in the image being characterized an edge image of the shape content;

replicating original pixels that comprise the edge image; and

offsetting each such replicated pixel from its corresponding original pixel by an equal distance and angular orientation to the original pixel to create a ghost image.

11. The method of claim 10, replicating the pixels that comprise the ghost image with less light energy than the corresponding pixels of the edge image.

12. An optical image shape content analyzer, comprising:

a Fourier transform lens having a focal point in focal plane at a focal distance;

a spatial light filter comprising: (i) a filter spatial light modulator that has an active optic area around a central axis positioned in the focal plane of the Fourier transform lens with the central axis coincident with the focal point, said active optic area comprising discrete active optic components that are capable of selective activation to selectively rotate or not rotate plane of polarization of light incident at various angular orientations in relation to the central axis; and (ii) a polarization analyzer that is capable of separating light polarized in one plane from light polarized in another plane;

an image producing spatial light modulator with an associated monochromatic light source, wherein the image producing spatial light modulator is

addressable to produce an image in an optic pattern with light from the associated monochromatic light source, said image producing spatial light modulator being positioned to project such an image optic pattern of monochromatic light through the Fourier transform lens to form a Fourier transform optic pattern of the image optic pattern at the focal plane of the Fourier transform lens; and

a photodetector positioned to receive light filtered by the spatial light filter, said detector including an array of sensors that are capable of detecting filtered patterns of light energy intensities in the filtered light.

13. The optical image shape content characterizer of claim 12, wherein the discrete active components are disposed in the active optic area in a manner that extends radially outward at various angular orientations in relation to the central axis.

14. The optical image shape content characterizer of claim 13, wherein the discrete active components comprise individual sectors of the active optic area.

15. The optical image shape content characterizer of claim 14, wherein the discrete active components comprise individually addressable segments of the sectors.

16. The optical image shape content characterizer of claim 15, wherein the individually addressable segments are disposed radially in relation to the central axis to form the active optic sectors.

17. The optical image shape content characterizer of claim 13, wherein the discrete active components comprise rectangular components extending radially in relation to the central axis.

18. The optical image shape content characterizer of claim 13, wherein the active optic area comprises a rectangular spatial light modular array of active optic elements and the discrete active components comprise active optic elements of a rectangular array of such elements that are activatable in distance groups of such elements that extend radially outward in relation to the central axis.

19. A spatial light modulator, comprising an active optic area around a central axis, said active optic area comprising a plurality of active optic modulators that extend radially at various angular orientations in relation to the central axis.

20. The spatial light modulator of claim 19, wherein each active optic modulator includes a sector of the active optic area.

21. The spatial light modulator of claim 20, wherein each sector comprises a plurality of individually addressable active optic segments positioned to extend serially in one of said angular orientations.

22. The spatial light modulator of claim 19, wherein each active optic modulator is rectangular.

23. The spatial light modulator of claim 22, wherein each rectangular active optic modulator comprises a plurality of individually addressable active optic segments positioned to extend serially in one of said angular orientations.

24. The spatial light modulator of claim 19, wherein the active optic area includes a rectangular array of optic sensors and each active optic modulator comprises a group of the optic sensors that are actuateable together simultaneously to modulate light and that together in the group are configured to form a composite of the active optic elements extending radially in relation to the central axis.